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TERRITORIAL

SCHOOL OF MINES,

GOLDEN.



GOLDEN:
TRANSCRIPT PRINT.
1874

ERRATUM.

In fourth line of third page read "industry" instead of "history."

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1872/74

“THE unassisted hand, and the understanding left to itself, possesses but little power. Effects are produced by the means of instruments and helps, which the understanding requires no less than the hand, and as instruments either promote or regulate the motion of the hand, so those that are applied to the mind prompt or protect the understanding.”

—Bacon, the Father of Experimental Philosophy.

see next page

TRUSTEES OF THE SCHOOL OF MINES:

HON. W. A. H. LOVELAND.....	Golden, Jefferson	County
HON. ALPHEUS WRIGHT.....	Boulder, Boulder	County
HON. N. P. HILL.....	Black Hawk, Gilpin	County
HON. J. MARSHALL PAUL.....	Fairplay, Park	County
HON. WILLIAM AMSBARY.....	Cañon City, Fremont	County
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C. C. DAVIS, ESQ.....	U. S. Mint, Denver, Arapahoe	County

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COMMITTEE OF THE TRUSTEES:

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FACULTY:

E. J. MALLET, JR., Dean....Theoretical Metallurgy, Chemistry
E. L. BERTHOUD, A. M.....Civil Engineering, Geology
RICHARD PEARCE, F. G. S....Theoretical and Practical Metallurgy
JULIUS POHLE, Ph. D.....Mechanical Preparation of Ores
FRANCIS SCHMIDT, A. M.....Mathematics, German and Spanish
ARTHUR LAKES.....Free-hand and Mechanical Drawing

Wadsworth



PROSPECTUS.

THE action of the Territorial Government in establishing a mining school within short range of the most developed mineral sections of the Territory appears to be generally conceded as one intimately connected with the legitimate history of Colorado. In no other mining region is the fact more conclusively demonstrated that a modified system of beneficiation is necessitated by the peculiar idiosyncrasies of the raw material. Any measure having the impress of utility in this regard should naturally be in sympathy with those intelligently developing our mineral resources. The scope of this utility is understood to be a public one, the receiving and imparting of knowledge bearing upon exploitation and reduction of ore, and upon technical education being the service it is hoped will be performed.



PLAN OF INSTRUCTION.

THE immediate proximity to "plant" and mines, admits of empirical conjointly with theoretical instruction. Field and school work proper may thus proceed simultaneously. The in-door studies embrace the following curriculum:

Metallurgy,	Chemistry (theoretical and applied),
Mineralogy,	Chemical Forces (heat, light, electricity),
Mining,	Chemical Analysis,
Geology,	Assaying (wet and dry),
Mining Engineering,	Blowpipe Analysis,
Higher Mathematics,	Free-hand and Mechanical Drawing,
German and Spanish,	Photography.

Lectures are delivered at regular hours, and the socratic method adopted whenever practicable. The students are given ample time to take *careful* notes. Subjects are illustrated by chemical and physical experiments, and by recourse to photographs of machinery, apparatus, eminent scientists, etc., by stereopticon projection, an experienced photographer preparing the slides at the school. When the nature of the study necessitates frequent reference to text-books, these can be supplied at New York prices.

PRESENT FACILITIES.

THE lower floor of the brick building on the right of the cut (see cover) is used for a metallurgical and analytical laboratory. The former is provided with a fire-brick assay furnace, a small reverberatory for roasting, etc., and a large pot furnace for general fusion, a Hibb's furnace for students' practice, appliances for the comminution and sifting of ores, sand bath with hood, stills, anvils, agate and iron mortars and bullion scales, apparatus for volumetrical assaying, etc., etc. The analytical laboratory is provided with the usual reagent tables and appliances. On the second floor the largest room is devoted to the display of mineralogical, metallurgical and geological cabinets. There are numerous specimens, comprising the fossils so abundantly found in the vicinity, typical economic minerals, both domestic and foreign, lithological specimens of various geological strata, minerals illustrative of color, cleavage, crystallographic form, crystal models, and an herbarium of many domestic speci-

mens. Adjoining the cabinet room is a laboratory and stock room, in which are kept an assortment of chemicals and apparatus for students' use, and for the preparation of lecture experiments, a dark room for photographic purposes, accommodations for original research, etc.

The lecture room occupies all of the third floor, and communicates with general laboratory by elevator. A calcimined screen hinged against the ceiling can be made to swing down in front of the lecture table when photographic projections are used.

The cabinet of physical apparatus is well supplied by the best makers. Specially mentionable are—Browning's two-prism spectroscope, induction coil, two Queen's mahogany oxy-hydrogen stereopticons, upright lantern, etc., large plate electric machine, powerful bichromate galvanic battery, air pump, silver-plated parabolic reflectors, complete photographic outfit, bisulphide prisms, large automatic rotator for geissler tubes, spectrum tubes, nickel-plated microscope, apparatus for electric light in vacuo, an assortment of glass positives, goniometer, etc., etc. The chemical cabinet embraces an assortment of chemicals, industrial products, apparatus such as Hoffman's large eudiometers, cotemporary electric decomposition apparatus, decomposing tubes, steam-tight determination apparatus, Becker's balances, an assortment of blow-pipes of various forms, Plattner's moulds for blow-pipe use, globes for burning phosphorous, etc., in oxygen, diamond mortar, Geissler & Mohr's burettes, hydrometers, rare metals for spectroscopes, all necessary apparatus for qualitative and quantitative analysis, etc., etc. The building and grounds are supplied from a reservoir distant 3,500 feet, the water being conveyed in iron pipes.

CHEMISTRY.

THE chemical theories of the present day contrast so strongly with those prevalent a short time since, that considerable difficulty has been experienced in attempting to present the ideas of chemical philosophy as now accepted, the old notions being continually thrust before the student turn where he will. It has been decided, therefore, to begin the study of chemical philosophy at the time when Lavoisier's antiphlogistic notions replaced those of Becher and Stahl, to illustrate by experiment the facts which caused the growth of dualism, the atomic theory of Dalton, the Guytonienne nomenclature, and the symbols of

Berzelius. Finally, bring to bear experiments and theories which tend to strengthen dualistic views, bring Lavoisier's notions to their apogee, and then allow the student a limited time to retain a hold of them. The experiments and theories relative to substitution and other facts tending to militate against dualism then follow, and the student finds himself constrained to relinquish a theory inadequate to explain facts. He thus gradually assimilates the unitary ideas of Gerhardt, atomicity is developed, and reaching the top of the mountain, not *per saltum*, but *per gradus*, receiving notions as they were *actually* developed, enjoys an extended and intelligent view of the whole subject.

FIELD WORK.

IF around the school as a centre we inscribe a circle, having a radius of thirty-five miles, and divide this by a diameter running nearly north and south, the western half will include the most developed mineral regions of the Territory, easy access to most points being secured by rail. The school is situated about one mile east from the base of the Rocky Mountains, and west of an upheaved basaltic-crested ridge following the general trend of the mountains and known as the "Hogbacks." These spurs are particularly characterized by zeolites and by their numerous beds of fossil remains, which have supplied the school with a valuable paleontological cabinet. Uptilted seams of non-coking mineral fuel, bearing nearly north and south, supply the vicinity with excellent coal, and the mines which are at present quite extensively worked, are visited by students in metallurgy. To the south are stone quarries, plaster works, and lime kilns, while at Golden, the manufacturing centre of the Territory, furnished with abundant water power from the Vasquez Fork, is situated the Golden Smelting Works, particularly successful with low-grade ores, fire-brick and pottery works, paper mill, iron foundries, flour mills, breweries, etc. To the north is the mining district of Gold Hill, near to which is situated the Boulder Smelting Works. The celebrated "Red Cloud," "Americus," "Ni Wot," and other mines, and also a region particularly interesting to the mineralogist, affording native tellurium, auriferous hessite, sylvanite, beside numerous minerals of minor interest, render this a most important district. Silver, gold, and placer mining districts may be reached *via* Clear Creek Cañon, unsurpassed for scenic grandeur. At Central, Nevada,

and Black Hawk masses of buried wealth, such as the "Gregory," "Kansas," "Bobtail," "California," etc., afford facilities for the study of exploitation. About seventeen mills are in operation at this point, running 465 stamps. Wet crushing and amalgamation is here characteristic. Concentrating works are also a feature. Large and successful smelting works may be here visited, where heap and furnace roasting, calcining, smelting, Ziervogel, and Augustin processes, etc., are seen in operation, beneficiating ore yielding monthly over \$120,000 in gold, silver and copper. North of this point we soon reach the prosperous mining region of Caribou. To the south, passing up Russell Gulch and down Virginia Cañon, we find at Idaho large concentrating and smelting works and placer diggings. Following Clear Creek until it forks at Leavenworth Mountain, we enter the silver district of Georgetown. The "Dives," "Pellican," "Terrible," and other veins, possessed only by millionaires, represent the most skillful development. The famous Marshall and Burleigh tunnels, concentrating works, barrel amalgamation works, Bruckner roasting, sampling establishments, mills, etc.—one of which having a daily bullion product of \$2,500—bestow upon this locality a highly intrinsic value for mining, metallurgical and mineralogical study. From here the higher peaks, passes and parks are soon reached.

During the term recesses will be taken for practical study in metallurgy and general exploitation in the localities mentioned. The Freiburg system (modified) will be adopted, and is only rendered possible through the hearty co-operation of our leading metallurgists and mining companies, who thus generously afford unusual facilities for the intelligent prosecution of empirical study. Frequent excursions to mining districts thus become a *feature* of the school. By affording healthful exercise in the pure air of the mountains, both mind and body return invigorated, and studies are again pursued with deeper interest because their practical application is so forcibly presented. The graduate having thus *felt* his work during the entire course is prepared to assume one of the many responsible and lucrative positions continually created by the mining interests of the Territory.

CLASSICS.

WITHIN the *campus* is the Jarvis Hall collegiate school, where instruction can be received from gentlemen eminently qualified. Circulars of this school can be obtained of the principal, Rev. T. L. Bellam, or Bishop J. F. Spaulding.

EXPENSES.

THE school year is divided into three sessions, as follows:

- FEE \$55. { 1st Session begins First Wednesday in September.
 { 1st Session closes 24th of December. Two weeks vacation.
 FEE \$55. { 2d Session begins 8th of January.
 { 2d Session closes 2d of April. One week vacation.
 FEE \$40. { 3d Session begins 10th of April.
 { 3d Session closes 30th of June. Nine weeks vacation.

Fee for whole course, which includes all branches taught, per year of three sessions.....	\$160
Fee for special course in analytical chemistry.....	135
“ “ “ “ “ assaying and blow-pipe analysis.....	40
“ “ “ “ “ photography.....	25
Single courses of lectures.....	\$10—18

Fees must be paid in advance at the beginning of each session.

Students in the analytical laboratory on depositing \$15 receive the full equipment of apparatus and chemicals, the catalogue price being allowed for all uninjured articles returned. Those taking a course in the collegiate school, and a partial course in the mining school, are charged at the rate of \$400 per school year, which includes lodging, commons, washing, lights, fuel, and mending.

Mining students can obtain accommodations in Golden, or—at the rate of \$8 per week—at Matthews Hall, adjoining the School of Mines, making the total expense for scientific course, board and lodging, \$470 per school year. Expenses during camping excursions are included in the above charges, excepting a small fee for transportation. Students taking a full course must enter at the beginning of a session—those taking a special course may enter at any time.

DIPLOMAS.

THE course of instruction occupies three years, after which the Territorial or State Diploma is awarded to successful candidates. Special diplomas will be given to those thoroughly proficient in any special department.

NOWING Owing to unavoidable delays, the first session will not begin until the 15th of September.

Hallway Hall

James Hall's

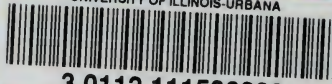
School of Music

Perry & Bolin Litho Denver Col



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